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PROCESS FOR THE PREPARATION OF HAIR CARE AGENTS

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The documents which are attached to this sheet are a copy of the originally filed specification with claim(s) and drawing(s) if any.

The invention pertains to a process for the preparation of hair care agents in which one or more active substances have been included for combatting the formation of dandruff.

In the case of healthy skin, skin cells regularly die off and then become detached from the skin and can be removed by combing or washing the hair. These skin cells that have died off are generally so small that they cannot be seen with the eye. Sometimes, however, many cells that have died off become detached simultaneously in the form of small, visible scales that are termed "dandruff".

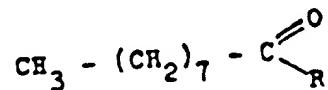
Dandruff can be caused by an innocuous skin disease, whereby the skin cells die off in an accelerated manner. This is usually accompanied by slight itching. However, dandruff can also occur in the case of healthy skin, namely when the skin cells that have died off are not removed directly from the skin but remain adhering to the skin, e.g. via grease, sebum or moisture, and become detached from the skin only later in combination with surrounding cells.

Although dandruff is an innocuous phenomenon per se, it is found to be annoying and unesthetic by most of the people who have trouble with it, and thus many preparations have already been developed that combat the formation of dandruff to a greater or lesser extent.

Known substances that have been recommended for this objective are bacteriostatic or bactericidal substances, such as zinc pyridinethione, undecylenic acid derivatives, particularly undecylenic acid monoethanolamide, 3,4,4,-trichlorosalicylanilide, etc. Keratolytically acting compounds, such as salicylic acid, selenium disulfide and sulfur, whether or not in combination with bactericidal substances, are also recommended for this objective.

It has now been found that substances that are derived from pelargonic acid have a surprisingly effective action to counter the formation of dandruff.

The objective of the invention is a process for the preparation of cosmetic preparations, such as hair shampoo, hair tonic, hair creme, hair lacquer and other hair care agents that combat dandruff in an effective manner and do not irritate the skin, whereby this process is characterized by the feature that one or more substances with the formula



are included in these preparations, in which R is an arbitrary functional group.

R can represent either an inorganic group or an organic group.

In the event that R represents an organic group, the best results are obtained if the group contains less than 10 carbon atoms.

It has in fact been found that the group R can wholly or partially nullify the anti-dandruff activity of the pelargonoyl residue, whereby the number of carbon atoms, which are contained in the group R, has an influence. In general, the anti-dandruff activity decreases as the number of carbon atoms increases.

If R is a group with 10 or more carbon atoms, then the anti-dandruff activity is usually reduced to such an extent that uneconomically high concentrations are necessary for formulating an effectively active product.

In a preferred form of embodiment, R represents one of the groups

-O(CH₂)_nH, -NH(CH₂)_nH, -NH(CH₂)_nOH or [(CH₂)_nOH]₂

in which n is a whole number from 0 through 9.

The monoethanolamide derivative and the diethanolamide derivative of pelargonic acid are especially preferred.

The selection of the group R is determined in part by the requirement that the substance is not permitted to irritate the skin. The selection of the group R can also be influenced by the composition into which one or more of the substances in accordance with the invention have been incorporated.

Pelargonic acid monoethanolamide or pelargonic acid diethanolamide is usable in products that are water based, whereas pelargonamide is especially well usable in the presence of a sufficient quantity of alcohol.

Although many derivatives of pelargonic acid are possible, those who are skilled in the art will have few problems in selecting the group R.

The pelargonic acid derivatives can be applied in a concentration of 0.1 to 25% in various hair care agents. The desired concentration is especially dependent on the nature of the product in which one or more of the active substances are used.

Liquids, both alcoholic and aqueous solutions, are usable as vehicles for active substances. These liquids can optionally contain propellant gases which have been compressed to give a liquid, if the substances in accordance with the invention are incorporated into an aerosol composition. Moreover, gels, emulsions, dispersions or powders, etc. can also serve as vehicles.

Depending on the intended use of the product, other substances can be included in the composition, such as foaming agents, film-forming agents, thickeners, perfumes and dyes.

The pelargonic acid derivatives are found to combat the formation of dandruff effectively in all cosmetic preparations. Their application in a shampoo is particularly preferred, however.

The action of pelargonic acid and its derivatives is not yet completely clear. However, it seems from the tests that have been described below that these compounds have a bactericidal or bacteriostatic action. *Pityrosporum ovale*, the bacterium that is generally regarded as being the main cause of dandruff formation, is combated, in particular, by pelargonic acid and its derivatives. The pelargonoyl group presumably blocks an enzyme system that plays an important role in the metabolism of *Pityrosporum ovale*.

The effective anti-dandruff action of pelargonic acid and its derivatives has been demonstrated by a number of tests. In this connection, the formation of dandruff was determined visually for a number of test persons and, in addition, a determination was made of the quantity of *Pityrosporum ovale* that was present on the scalp. The quantity of dandruff was indicated by a number, whereby 5 was the maximum score and 0 was the score if no dandruff could be

observed. The evaluation took place by one person who was not aware of the formulation of the preparations that were being tested. 10 test persons were used for each test preparation. The numbers below show the average of 10 observations in each case.

A measure of the quantity of microorganisms (*Pityrosporum ovale*) on the scalp was obtained by taking a sample of the skin with a plastic hair brush with 130 points on it; the sample was then cultivated on an agar plate with a selective medium. The maximum score is thereby 130. If no *Pityrosporum ovale* are present, the score is 0.

An anti-dandruff shampoo was formulated for a test and contained:

sodium lauryl ether sulfate	15.0%
diethanolamide of a coconut based fatty acid	2.0%
pelargonic acid monoethanolamide	5.0%
perfumes, dyes and preserving agents	q.s.
water	to 100%

The same shampoo in which the pelargonic acid monoethanolamide had been replaced by the diethanolamide of a coconut based fatty acid served as a placebo.

Washing was undertaken weekly with this shampoo and a measurement was regularly carried out 4 days after washing.

	<u>placebo</u>		<u>test group</u>	
	dandruff score	<i>Pit. ov.</i> score	dandruff score	<i>Pit. ov.</i> score
starting value	4.2	100	4.3	96
after the 1st wash	4.0	80	4.2	75
after the 2nd wash	4.1	86	3.2	20
after the 3rd wash	4.4	75	1.8	0

An identical test was carried out with a shampoo in which pelargonamide was used instead of pelargonic acid monoethanolamide.

All the dandruff had disappeared after 2 washes with this shampoo..

A hair lotion was formulated that contained:

ethanol	30.0%
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pelargonic acid monoethanolamide	0.1%
pelargonamide	0.1%
dye, perfume, preserving agent	q.s.
water	to 100%

This hair lotion, applied daily, markedly reduced the formation of dandruff after only 1 week.

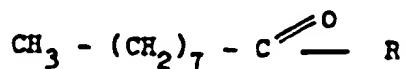
A hair tonic with anti-dandruff action was formulated and contained:

polyvinylpyrrolidone/vinyl acetate copolymer	2.5%
lanolin	0.2%
perfume, dye	q.s.
pelargonic acid diethanolamide	0.1%
ethanol	20.0%
water	to 100%

After 4 weeks, the dandruff score had decreased from 4.2 to 2.7 and the number of *Pityrosporum ovale* had decreased from 104 to 37 when this hair tonic was used weekly.

Claims

1. Process for the preparation of a hair care agent for combatting dandruff, with the characterizing feature that one or more substances with the formula



are included therein, in which R is an arbitrary functional group.

2. Process in accordance with Claim 1, with the characterizing feature that R represents an organic group that contains less than 10 carbon atoms.

3. Process in accordance with Claim 1 or 2, with the characterizing feature that R represents one of the groups



in which n is a whole number from 0 through 9.

4. Process in accordance with Claims 1-3, with the characterizing feature that, as the anti-dandruff agent, use is made of pelargonoyl monoethanolamide and/or pelargonoyl diethanolamide in an aqueous composition.

5. Process in accordance with Claims 1-3, with the characterizing feature that, as the anti-dandruff agent, use is made of pelargonamide in an alcoholic composition.

6. Process in accordance with Claims 1-5, with the characterizing feature that 0.1 to 25% of the anti-dandruff agent is used.

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